

**Code: 19AC21T**

I B.Tech. II Semester Supplementary Examinations November 2023

**Differential Equations and Vector Calculus**

(Common to All Branches)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks)

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## UNIT-I

- |                                      | Marks | CO  | BL |
|--------------------------------------|-------|-----|----|
| 1. a) Solve $(D^2 + 4)y = \cos x$    | 7M    | CO1 | L3 |
| b) Solve $(D^2 + 6D + 9)y = e^{-3x}$ | 7M    | CO1 | L3 |

OR

- |   |     |     |    |
|---|-----|-----|----|
| 2. Solve $\frac{d^2 y}{dx^2} - 3\frac{dy}{dx} + 2y = xe^{3x} + \sin 2x$ | 14M | CO1 | L3 |
|---|-----|-----|----|

## UNIT-II

- |   |     |     |    |
|---|-----|-----|----|
| 3. Solve $x^2 \frac{d^2 y}{dx^2} - 4x \frac{dy}{dx} + 6y = x^2$ | 14M | CO2 | L3 |
|---|-----|-----|----|

OR

- |  |     |     |    |
|--|-----|-----|----|
| 4. Solve $(1+x)^2 \frac{d^2 y}{dx^2} + (1+x) \frac{dy}{dx} + y = 2\sin[\log(1+x)]$ | 14M | CO2 | L3 |
|--|-----|-----|----|

## UNIT-III

- |  |    |     |    |
|--|----|-----|----|
| 5. a) Form the partial differential equations by eliminating arbitrary functions from $f(x^2 + y^2, z - xy) = 0$                           | 7M | CO3 | L3 |
| b) Form the partial differential equation by eliminating arbitrary constants a and b from $z = a \log \left\{ \frac{b(y-1)}{1-x} \right\}$ | 7M | CO3 | L3 |

OR

- |  |    |     |    |
|--|----|-----|----|
| 6. a) Form the partial differential equation by eliminating arbitrary function from $z = f(x^2 + y^2)$ | 7M | CO3 | L3 |
| b) Solve $pyz + qzx = xy$  | 7M | CO3 | L3 |

## UNIT-IV

- |  |    |     |    |
|--|----|-----|----|
| 7. a) Find $\text{div } \vec{f}$ where $\vec{f} = \text{grad}(x^3 + y^3 + z^3 - 3xyz)$ | 7M | CO4 | L2 |
| b) Find $\text{grad } f$ where $f = x^3 + y^3 + 3xyz$                                  | 7M | CO4 | L2 |

OR

- |   |     |     |    |
|---|-----|-----|----|
| 8. Prove that $r^n \vec{r}$ is solenoidal if $n = -3$ . | 14M | CO4 | L2 |
|---|-----|-----|----|

## UNIT-V

- |   |     |     |    |
|---|-----|-----|----|
| 9. Verify Stokes theorem for the function $\vec{F} = x^2 \vec{i} + xy \vec{j}$ integrated around the square in the plane $z=0$ whose sides are along the lines $x=0, y=0, x=a, y=a$ . | 14M | CO5 | L3 |
|---|-----|-----|----|

OR

- |   |     |     |    |
|---|-----|-----|----|
| 10. Using Green's theorem evaluate $\oint_C (2xy - x^2)dx + (x^2 + y^2)dy$ , where C is the closed curve of the region bounded by $y = x^2$ and $y^2 = x$ . | 14M | CO5 | L3 |
|---|-----|-----|----|

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**Code: 19A324T**

I B.Tech. II Semester Supplementary Examinations November 2023

**Engineering Graphics & Design**  
(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

Marks    CO    BL

**UNIT-I**

- |    |  |     |     |    |
|----|--|-----|-----|----|
| 1. | Construct an ellipse, when the distance of the focus from the directrix is equal to 50 mm and eccentricity is $\frac{2}{3}$ . Also draw tangent and normal to the curve at a point 40mm from the directrix | 14M | CO1 | L2 |
|----|--|-----|-----|----|

**OR**

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 2. | The major and minor axes of an ellipse are 120mm and 80mm. Draw an ellipse by Concentric Circles method | 14M | CO1 | L2 |
|----|---|-----|-----|----|

**UNIT-II**

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 3. | Draw a hypocycloid of a circle of 40mm diameter, which rolls inside another circle of 160mm diameter, for one revolution counter clockwise. Draw a tangent & a normal to it at a point 65mm from the centre of the directing circle | 14M | CO2 | L2 |
|----|---|-----|-----|----|

**OR**

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 4. | Draw an involute for a circle of diameter 50 mm. Also draw a normal and tangent to the curve at a distance of 100mm from the center of circle | 14M | CO2 | L2 |
|----|---|-----|-----|----|

**UNIT-III**

- |    |  |     |     |    |
|----|--|-----|-----|----|
| 5. | A point is 50mm from both the reference planes. Draw its projections in all possible positions | 14M | CO3 | L3 |
|----|--|-----|-----|----|

**OR**

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 6. | A line PQ, 50mm long is perpendicular to H.P. and 15mm in front of V.P. The end P, nearer to H.P is 20mm above it. Draw the projections of a line | 14M | CO3 | L3 |
|----|---|-----|-----|----|

**UNIT-IV**

- |    |   |     |     |    |
|----|---|-----|-----|----|
| 7. | A square ABCD of 40mm side has a corner on the HP and 20mm in front of the VP. All the sides of the squares are equally inclined to the HP and parallel to the VP. Draw its projections | 14M | CO4 | L3 |
|----|---|-----|-----|----|

**OR**

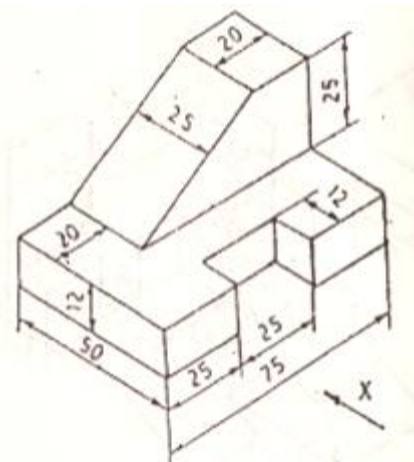
- |    |  |     |     |    |
|----|--|-----|-----|----|
| 8. | Draw the projections of a regular hexagon of 25mm side, having one of its sides in the HP and inclined at $60^\circ$ to the VP and its surface making an angle of $45^\circ$ with the HP | 14M | CO4 | L3 |
|----|--|-----|-----|----|

**UNIT-V**

- |    |  |     |     |    |
|----|--|-----|-----|----|
| 9. | Draw the projections of a right circular cylinder diameter of base 30mm and height 60mm resting on HP on its base, such that the axis is parallel to VP and inclined at $30^\circ$ to HP | 14M | CO5 | L3 |
|----|--|-----|-----|----|

**OR**

- |     |  |
|-----|--|
| 10. | Convert the following isometric view to orthographic views |
|-----|--|



14M    CO5    L3

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Hall Ticket Number :

**R-19**

**Code: 19AC22T**

I B.Tech. II Semester Supplementary Examinations November 2023

**Applied Physics**

(Computer Science and Engineering)

Max. Marks: 70

Time: 3 Hours

Answer any five full questions by choosing one question from each unit (5x14 = 70 Marks )

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Important Note: 1. On completing your answers. Compulsorily draw diagonal cross line on the remaining blank pages.  
2. Any revealing of identification, appeal to evaluator and/or equations written eg. 32+8=40, will be treated as malpractice.

Marks CO BL

**UNIT-I**

1. a) Explain the double refraction. 5M CO1 2  
b) Describe the construction and working of Nicol's prism 9M CO1 1

**OR**

2. a) What is Diffraction grating? Explain how the wavelength is determined by using grating. 8M CO1 1,2  
b) Write the engineering applications of diffraction 6M CO1 1

**UNIT-II**

3. a) Describe the origin of magnetic moment in magnetic materials 7M CO2 1  
b) Explain the hysteresis loss of ferromagnetic material 7M CO2 2

**OR**

4. a) Explain the magnetic bubble memory in magnetic materials 10M CO2 2  
b) A circular loop of copper having a diameter of 10cm carries a current of 500mA. Calculate magnetic moment associated with the loop 4M CO2 3

**UNIT-III**

5. a) State and prove the Stoke's theorem for curl 7M CO3 1,3  
b) Explain pointing theorem in electromagnetics 7M CO3 2

**OR**

6. a) Describe construction and working principle of optical fiber 9M CO3 1  
b) Mention the applications of optical fiber in medicine. 5M CO3 3

**UNIT-IV**

7. a) State and explain Hall effect in semiconductors and derive expression for hall coefficient 10M CO4 1,2  
b) Write the applications of hall effect 4M CO4 1,2

**OR**

8. a) Discuss the effect of temperature on charge carrier concentration in N-type semiconductor 7M CO4 2  
b) Explain the conductivity of intrinsic semiconductor with relevant expressions 7M CO4 2

**UNIT-V**

9. Describe DC and AC Josephson effects in superconductors and mention its applications 14M CO5 2,3

**OR**

10. a) Define the following terms i) superconductivity ii) critical temperature iii) critical magnetic field and iv) Nanomaterials 8M CO5 1  
b) Mention the properties of superconductors 6M CO5 3

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